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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 09/755,053

Filing Date: January 08, 2001

Appellant(s): BERTEZ ET AL.

MAILED

JUL 28 2004

GROUP 1700

Eric Jensen
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 5-24-04.

(1) *Real Party in Interest*

A statement identifying the real party in interest is contained in the brief.

(2) *Related Appeals and Interferences*

A statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief.

(3) *Status of Claims*

The statement of the status of the claims contained in the brief is correct.

(4) *Status of Amendments After Final*

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) *Summary of Invention*

The summary of invention contained in the brief is correct.

(6) *Issues*

The appellant's statement of the issues in the brief is correct.

(7) *Grouping of Claims*

Appellant's brief includes a statement that **a)** claims 1, 2, 5-8, 11, 12, 14, 15, and 22-30 and **b)** claim 9 do not stand or fall together and provides reasons as set forth in 37 CFR 1.192(c)(7) and (c)(8). There are two separate groups present.

(8) *ClaimsAppealed*

The copy of the appealed claims contained in the Appendix to the brief is correct.

(9) *Prior Art of Record*

6,175,096	Nielsen	1-2001
4,781,907	McNeill	11-1988
WO 96/23624	Rolf et al.	8-1996

(10) *Grounds of Rejection*

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-2, 5-8, 11-12, 14-15 and 22-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nielsen (6,175,096) in view of Rolf et al. (WO 96/23624). With respect to Claims 1, 5, 12, 14, 22 and 25-27, Nielson teaches a method of cutting a workpiece made of stainless steel (Column 1, Lines 25-35 and column 2, Lines 50-56) by the use of at least one transparent or reflecting optical means for focusing at least one laser beam in which the optical means is the multifocus type (Figure 1a and Item 1a). Nielson teaches the use of an assist gas using nitrogen but does not specifically teach an oxygen/nitrogen mixture. Rolf et al. teach a laser beam method of cutting stainless steel where the assist gas is an oxygen nitrogen mixture containing the claimed range and no other gas than the assist gas is supplied to the nozzle (Page 5, Lines 3-9 and Page 2, Lines 25-30). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the gas of Nielson to utilize the assist gas of Rolf et al. in order to increase the laser cutting speed (see Rolf et al. Page 2, Lines 25-30).

With respect to Claims 2, 11, and 23-24 the teachings of Nielson and Rolf et al. are the same as relied upon in the rejection of Claim 1. Nielsen teaches the mutlifocus optical means is a bifocal lens (Claim 3).

With respect to Claims 6, 15, 28 and 29, the teachings of Nielson and Rolf et al. are the same as relied upon in the rejection of Claim 1. Nielsen teaches the optical means is arranged so as to obtain at least one focusing point positioned near the upper surface of the workpiece to be cut (Figure 1a, item f1) and at least one second focusing point positioned near the lower surface

of the workpiece to be cut and in the thickness of the latter (Figure 1a, item f2) wherein the first focusing point is positioned so as to coincide with the upper surface (Figure 1a, f1).

With respect to Claims 7 and 30, the teachings of Nielson and Rolf et al. are the same as relied upon in the rejection of Claim 1. Nielsen teaches the workpiece can be as high as 15 mm, however it would have been obvious to one of ordinary skill in the art at the time of the invention to decrease the thickness of the workpiece to be cut between 1.5 and 5mm in order to minimize slag and increase the cut quality (see Nielsen Column 1, Lines 30-37).

With respect to Claim 8, the teachings of Nielson and Rolf et al. are the same as relied upon in the rejection of Claim 1. Nielsen teaches the workpiece is chosen from plates (Claim 1).

Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nielsen (6,175,096) and Rolf et al. (WO 96/23624) as applied to claim 1 above and further in view of McNeill (4,781,907). McNeill teaches a nitrogen/ oxygen mixture obtained from air treated by a membrane system (Column 1, Line 40 through Column 2, Line 65). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the assist gas of Nielsen and Nagata et al. [sic, Rolf et al.] to utilize the membrane system in order to achieve a relatively pure nitrogen stream (McNeil Column 1, Lines 40-47).

(11) Response to Arguments

Appellants argue that the combination of Nielsen (6,175,096, hereinafter Nielsen '096) and Rolf et al. (WO 96/23624) is improper because Nielsen '096 teaches that “only pure gases can be used for cutting ordinary steel (specifically, oxygen) and stainless steel (specifically, nitrogen) when using a multiple focus lens” while Rolf et al. teach the use of nitrogen/oxygen mixtures for laser cutting stainless steels or other steels “only when cutting with a single focus lens, not a multifocus lens” (Appellants Brief, page 5, first and second full paragraph). The examiner disagrees with Appellants’ characterization of both the Nielsen '096 and Rolf et al. Nielsen '096 does not teach that “only pure gases can be used for cutting ordinary steel (specifically, oxygen) and stainless steel (specifically, nitrogen)” as stated by Appellants. Instead, Nielsen '096 teaches that the cutting gas “depends on the material to be cut” and that the examples provided by Nielsen '096 were merely “typical” for the particular material (Nielsen '096, col. 2, ll. 49-56). Similarly, the examiner disagrees with Appellants’ assertion that Rolf et al. teach that the use of nitrogen/oxygen mixtures “only when cutting with a single focus lens, not a multifocus lens” (Appellants Brief, page 5, third full paragraph). It is the examiner’s position that Rolf et al. broadly teach that their cutting gas can be applied to any process involving laser cutting stainless steel (Rolf et al., page 1, l. 10 to page 2, l. 12). The examiner notes that Rolf et al. is silent with regard to the particular type of laser beam cutting process (i.e., the type of focusing lens or its operation). Rolf et al. only states that “the laser beam is focused onto the workpiece to be cut” (Rolf et al., page 1, ll. 15-16). This statement does not teach the use of only a single focus lens as this statement could be broadly construed to include an instance where the laser beam is focused onto the workpiece having multiple focus points.

Next, Appellants argue that the combination of Nielsen '096 and Rolf et al. is based on hindsight. The examiner disagrees. Any judgment on obviousness is in a sense necessarily a reconstruction based on hindsight reasoning, but so long as it takes into account only knowledge which was within the level of ordinary skill in the art at the time the claimed invention was made and does not include knowledge gleaned only from Appellants' disclosure, such a reconstruction is proper. In re McLaughlin 443 F.2d 1392, 1395, 170 USPQ 209, 212 (CCPA 1971). As stated in the Final office action:

Nielson teaches a method of cutting a workpiece made of stainless steel (Column 1, Lines 25-35 and column 2, Lines 50-56) by the use of at least one transparent or reflecting optical means for focusing at least one laser beam in which the optical means is the multifocus type (Figure 1a and Item 1a). Nielson teaches the use of an assist gas using nitrogen but does not specifically teach an oxygen/nitrogen mixture. Rolf et al. teach a laser beam method of cutting stainless steel where the assist gas is an oxygen nitrogen mixture containing the claimed range and no other gas than the assist gas is supplied to the nozzle (Page 5, Lines 3-9 and Page 2, Lines 25-30). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the gas of Nielson to utilize the assist gas of Rolf et al. in order to increase the laser cutting speed (see Rolf et al. Page 2, Lines 25-30).

In the instant case, it is the examiner's position that the combination of Nielsen '096 and Rolf et al. is not based on hindsight. No knowledge was gleaned from Appellants' disclosure in the determination of obviousness. Only knowledge within the level of ordinary skill in the art at the time of the invention was made since the rejection was based on Nielsen '096 in view of Rolf et al. Additionally, the examiner would like to note that the motivation to combine (i.e, to increase the laser cutting speed) came from Rolf et al. and not from Appellants' disclosure.

Appellants next argue that the combination of Nielsen '096 and Rolf et al. is improper because they are nonanalogous art since Nielsen '096 uses a multi-focus lens and Rolf et al. use a single-focus lens (Appellants Brief, page 6, second full paragraph). The examiner disagrees. A

prior art reference is analogous if the reference is in the field of Appellants' endeavor or, if not, the reference is reasonably pertinent to the particular problem with which the inventor was concerned. In re Oetiker, 977 F.2d 1443, 1446, 24 USPQ2d 1443, 1445 (Fed. Cir. 1992). In this case, it is the examiner's position that the references satisfies both prongs. First, with respect to the field of endeavor, both Nielsen '096 and Rolf et al. are directed to laser cutting stainless steel workpieces. Nielsen '096 is directed to an improvement over a single-focus lens by using a multi-focus lens and an cutting gas to cut thick plates if stainless steel (Nielsen '096, col. 1, ll. 27-37). Rolf et al. is directed to using an inexpensive cutting gas when laser cutting stainless steel (Rolf et al., page 1, l. 35 to page 2, l. 12).

Second, with respect to the pertinency of the particular problem, "a reference is reasonably pertinent if, even though it may be in a different field from that of the inventor's endeavor, it is one which, because of the matter with which it deals, logically would have commended itself to an inventor's attention in considering his problem." Wang Laboratories Inc. v. Toshiba Corp., 993 F.2d 858, 26 USPQ2d 1767 (Fed. Cir. 1993). Nielsen '096 uses a multi-focus lens instead of a single-focus lens because the multi-focus lens allows for cutting plates having a thickness of 15 mm or more (Nielsen '096, Col. 1, ll. 25-30). Nielsen '096 explains that the accurate control of the laser beam focus point in the multi-focus lens reduces the formation of burrs (Nielsen '096, col. 1, ll. 24-25), melts and removes slag (Nielsen '096, col. 2, ll. 1-5), and provides a narrower hole in the plate (Nielsen '096, col. 1, ll. 49-50). Nielsen '096 further explains that the narrower hole in the plate allows for less cutting gas to be used (Nielsen '096, col. 1, ll. 40-55). Rolf et al., on the other hand, is completely silent with regard to the particular laser beam focal point. Rolf et al. is also silent with regard to the type of

focusing lens or its operation. Instead, Rolf et al. is concerned with lowering the cost of a laser cutting operation by using a nitrogen/oxygen mixture as a cutting gas instead of a pure nitrogen gas (Rolf et al., pages 2 and 3). Rolf et al. explain that the traditional pure nitrogen gas leads to a cut surface completely free of oxide (Rolf et al., page 2, ll. 1-5). Rolf et al. found, however, that the use of a nitrogen/oxygen mixture can also be used in a laser cutting process as it provides a cut surface having an acceptable amount of oxidation (Rolf et al., page 2). Additionally, Rolf et al. found that the small amount of oxygen in the cutting gas can increase the overall cutting speed process because the oxygen reacts with the base material and generates an exothermic reaction (Rolf et al., page 2, l. 31 to page 3, l. 1). Therefore, as stated in the previous office action, it would have been obvious to one of ordinary skill in the art at the time of the invention to replace the gas of Nielson with the gas of Rolf et al. in order to increase the laser cutting speed (Final office action). That is, the examiner believes that a person having ordinary skill in the art would have reasonably expected to solve the problem of lowering the overall cost of the laser cutting process and increase the laser cutting speed by replacing the pure nitrogen gas of Nielsen '096 with a nitrogen/oxygen mixture.

Appellants next argue that Nielsen '096 teaches away from the use of a single focus lens as Nielsen '096 teaches the use of a multi-focus lens only with the use of pure gases. The examiner disagrees. The examiner understands that a prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention.

W.L. Gore & Associates, Inc. v. Garlock, Inc., 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), cert. denied, 469 U.S. 851 (1984). In the instant case, while Nielsen '096 does suggest the use of a pure gas for cutting ordinary steel and stainless steel, Nielsen '096 explains that the "gas used

depends on the material to be cut" and that the examples provided were merely "typical" for the material (Nielsen '096, col. 2, ll. 49-56). It is the examiner's position that this general teaching does not rise to the level of "teaching away" as Nielsen '096 does not state or suggest that only pure gases should be used when using a multi-focus lens.

Appellants next cite another Nielsen patent (US 4,724,297, hereinafter Nielsen '297) to support their argument that although Nielsen knew about nitrogen/oxygen gas mixtures, he did not contemplate using them in his Nielsen '096 patent (Appellants Brief, page 7, first full paragraph to page 8, second full paragraph). While the examiner agrees that Nielsen '297 teach a nitrogen/oxygen gas mixture in a laser cutting process, the examiner cannot agree that the lack of an explicit teaching of a nitrogen/oxygen gas mixture in Nielsen '096 coupled with a teaching of a nitrogen/oxygen gas mixture in Nielsen '297 clearly teaches that only pure gases can be used in the laser cutting process involving a multi-focus lens in Nielsen '096 or that it would have been unobvious to use a nitrogen/oxygen gas mixture with the teachings of Nielsen '096. As stated previously, while Nielsen '096 does suggest the use of a pure gas for cutting ordinary steel and stainless steel, Nielsen '096 explains that the "gas used depends on the material to be cut" and that the examples provided were merely "typical" for the material (Nielsen '096, col. 2, ll. 49-56). It is the examiner's position that merely because Nielsen '096 is silent regarding the use of an alternative cutting gas coupled with a teaching of a nitrogen/oxygen gas mixture Nielsen '297 does not require a conclusion that all alternative cutting gases are excluded from Nielsen '096.

Appellants next cite a Nielsen affidavit to show the nonobviousness of the combination of Nielsen '096 in view Rolf et al. The submission of objective evidence of patentability does

not mandate a conclusion of patentability in and of itself. In re Chupp, 816 F.2d 643, 2 USPQ2d 1437 (Fed. Cir. 1987). While an opinion as to a legal conclusion is not entitled to any weight, the underlying basis for the opinion may be persuasive. In re Lindell, 385 F.2d 453, 155 USPQ 521 (CCPA 1967) (Although an affiant's or declarant's opinion on the ultimate legal issue is not evidence in the case, "some weight ought to be given to a persuasively supported statement of one skilled in the art on what was not obvious to him." 385 F.2d at 456, 155 USPQ at 524 (emphasis in original)). In the instant case, the affidavit by Nielsen states that he never considered using mixed gases in his multi-focus lens despite the fact that he was aware of using mixed gases in a single focus lens (Nielsen affidavit, page 2). While the Nielsen affidavit stating the combination of Nielsen '096 in view of Rolf et al. was not obvious to him is given substantial weight in determining the ultimate legal conclusion of obviousness, the examiner understands that facts established by rebuttal evidence must be evaluated along with the facts on which the conclusion of a *prima facie* case was reached, not against the conclusion itself. In re Eli Lilly, 902 F.2d 943, 14 USPQ2d 1741 (Fed. Cir. 1990). In the instant case, Nielsen does not explain the reasons or provide any experimental test data showing how a cutting gas for a single focus lens behaves differently from an cutting gas for a multi-focus lens. Instead, Nielsen only states that they deal with "different technologies." The Matille affidavit explains that each lens transmits energy in a different way to the workpiece (Matille affidavit, page 3). While the examiner agrees that the transmission of energy differs between the multi-focus lens and the single-focus lens, the examiner disagrees that this difference, coupled with the statements made in the Nielsen affidavit, overcomes the rejection made in the Final office action (Matille affidavit, page 3). Nielsen '096 is an improvement patent that uses a multi-focus lens instead of

a single-focus lens because the multi-focus lens allows for cutting plates having a thickness of 15 mm or more (Nielsen '096, Col. 1, ll. 25-30). Rolf et al. teach that a nitrogen/oxygen mixture leads to a faster cutting speed as the oxygen reacts with the base material to elevate its cutting temperature (Rolf et al., page 2, l. 31 to page 3, l. 5). Therefore, as stated in the previous office action, it would have been obvious to one of ordinary skill in the art at the time of the invention to replace the gas of Nielson with the gas of Rolf et al. in order to increase the laser cutting speed (Final office action). That is, the examiner believes that a person having ordinary skill in the art would have reasonably expected to solve the problem of lowering the overall cost of the laser cutting process and increase the laser cutting speed by replace the pure nitrogen gas of Nielsen '096 to with a nitrogen/oxygen mixture. The examiner notes that Appellants have not provided any evidence showing that the nitrogen/oxygen mixture would interfere with the laser cutting of plates having a thickness of 15 mm or more.

Appellants next argue that the two Nielsen patents and the Nielsen affidavit provide a strong framework for determination of obviousness. The ultimate determination of patentability must be based on consideration of the entire record, by a preponderance of evidence, with due consideration to the persuasiveness of any arguments and any secondary evidence. In re Oetiker, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). Although the record may establish evidence of secondary considerations which are indicia of nonobviousness, the record may also establish such a strong case of obviousness that the objective evidence of nonobviousness is not sufficient to outweigh the evidence of obviousness. Newell Cos. v. Kenney Mfg. Co., 864 F.2d 757, 769, 9 USPQ2d 1417, 1427 (Fed. Cir. 1988), cert. denied, 493 U.S. 814 (1989); Richardson-Vicks, Inc., v. The Upjohn Co., 122F.3d 1476, 1484, 44 USPQ2d 1181, 1187 (Fed. Cir. 1997). In the instant

case, while the examiner agrees that the two Nielsen patents and the Nielsen affidavit provide a strong showing of nonobviousness, it is the examiner's position that this evidence is not sufficient to outweigh the strong case of obviousness as taught by Nielsen '096 and Rolf et al.

To establish a *prima facie* case of obviousness, three basic criteria must be met: 1) there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings; 2) there must be a reasonable expectation of success; and 3) the prior art reference or references when combined must teach or suggest all the claim limitations. In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). Nielsen '096 is an improvement patent that uses a multi-focus lens instead of a single focus lens because the multi-focus lens allows for the possibility of cutting plates having a thickness of 15 mm or more (Nielsen '096, Col. 1, ll. 25-30). Nielsen '096 explains that the accurate control of the laser beam focal point in the multi-focus lens reduces the formation of burrs (Nielsen '096, col. 1, ll. 24-25), melts and removes slag (Nielsen '096, col. 2, ll. 1-5), and provides a narrower hole in the plate (Nielsen '096, col. 1, ll. 49-50). Nielsen '096 further explains that the narrower hole in the plate allows for less cutting gas to be used (Nielsen '096, col. 1, ll. 40-55). Rolf et al., on the other hand, is completely silent with regard to the control of the laser beam focal point. Rolf et al. is also silent regard to the type of focusing lens or its operation. Instead, Rolf et al. is concerned with lowering the cost of a laser cutting operation by using a nitrogen/oxygen mixture as a cutting gas instead of a pure nitrogen gas (Rolf et al., pages 2 and 3). Rolf et al. explain that the traditional pure nitrogen gas leads to a cut surface completely free of oxide (Rolf et al., page 2, ll. 1-5). Rolf et al. found, however, that the use of a nitrogen/oxygen mixture can also be used in a laser cutting process as

it provides a cut surface having an acceptable amount of oxidation (Rolf et al., page 2). Additionally, Rolf et al. found that the small amount of oxygen in the cutting gas can increase the overall cutting speed process because the oxygen reacts with the base material and generates an exothermic reaction (Rolf et al., page 2, l. 31 to page 3, l. 1). Therefore, as stated in the previous office action, it would have been obvious to one of ordinary skill in the art at the time of the invention to replace the gas of Nielson with the gas of Rolf et al. in order to increase the laser cutting speed (Final office action). That is, the examiner believes that a person having ordinary skill in the art would have reasonably expected to solve the problem of lowering the overall cost of the laser cutting process and increase the laser cutting speed by replacing the pure nitrogen gas of Nielsen '096 with a nitrogen/oxygen mixture.

With respect to the Matille affidavit, it is argued that there is a “synergistic effect” when using mixed gases with a multi-focus lens (Matille affidavit, third full paragraph). Additionally, the Nielsen affidavit also suggests a “synergistic effect” when he discusses the “great improvement” when using mixed gases with a multi-focus lens (Nielsen affidavit, page 3, first paragraph). Evidence of unobvious or unexpected advantageous properties, such as superiority in a property the claimed compound shares with the prior art, can rebut *prima facie* obviousness. In re Chupp, 816 F.2d 643, 646, 2 USPQ2d 1437, 1439 (Fed. Cir. 1987). A mere conclusion of unexpected results, however, is not enough to establish unexpected result. Ex parte George, 21 USPQ2d 1058 (Bd. Pat. App. & Inter. 1991) (conclusory statements that results were “unexpected,” unsupported by objective factual evidence, were considered but were not found to be of substantial evidentiary value). In the instant case, Appellants offer no evidence of unexpected results except for the assertion made in the Matille affidavit explaining that the use

of the multi-focus lens with a nitrogen/oxygen mixture offers substantially better results (e.g., faster cutting speed and lower gas consumption) than from the use of a single-focus lens (Matille affidavit, page 3). The Matille affidavit explains that each lens transmits energy in a different way to the workpiece (Matille affidavit, page 3). While the examiner agrees that the transmission of energy differs between the multi-focus lens and the single-focus lens, the examiner disagrees that a faster cutting speed in a multi-focus lens is unexpected result (Matille affidavit, page 3). It is the examiner's position that the faster cutting speed is an expected result as Rolf et al., the reference that teaches the use of a nitrogen/oxygen mixture, states that one of the added benefits of using a nitrogen/oxygen mixture--irrespective of the type of lens-- is a faster cutting speed as the oxygen reacts with the base material to elevate its cutting temperature (Rolf et al., page 2, l. 31 to page 3, l. 5). Similarly, it is the examiner's position that the faster cutting speed will likely reduce the amount of gas consumption as the cutting gas operating time is shortened.

Appellants finally argue that since the combination of Nielsen '096 in view of Rolf et al. is improper, the combination of Nielsen '096 and of Rolf et al. and further in view of McNeill is also improper. The examiner disagrees. As stated in the Final office action, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the cutting gas of Nielsen '096 and Rolf et al. to utilize an cutting gas from a membrane system in order to achieve a relatively pure nitrogen stream (McNeil, Column 1, Lines 40-47).

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,



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